

Scientific Report on the ERNI-HSF funded workshop, The developing brain: perspectives from typical and atypical development

Carmen de la Victoria, University of Granada, Spain. 15/09/2011 –
17/09/2011

Summary

The aim of the workshop was to bring together world leaders in psychiatry (children and adolescents), neuroscience, and (neuro) psychology in order to discuss the neural and cognitive basis of human brain development for healthy people and people who have a neurodevelopmental disorder. The developing brain: perspectives from typical and atypical development Workshop was held at Carmen de la Victoria, University of Granada, on 15th ~ 17th September, 2011. We were very pleased to have attracted a number of international experts, both to give invited talks and to attend. There were 75 attendees, including 19 speakers, providing a lively and dynamic workshop. There was no registration fee for participants at the workshop and travel bursary for young scientists to encourage the attendance of early career researchers. The workshop was organized by Charo Rueda, University of Granada, Vicki Anderson, University of Melbourne, Georgina Jackson, University of Nottingham, Gaia Scherif, University of Oxford, and Jeremy Stern, St Georges Hospital at London and was a great success.

Scientific content and discussion

The meeting aimed to start an in depth discussion of the neural and cognitive mechanism of human brain development and to investigate the difference between typical brain and atypical brain in terms of the developmental aspect. Professor Stephen Jackson (University of Nottingham) opened the meeting with an introduction to ERNI-HSF programme providing a broad work of European Science Foundation.

We arranged for the other invited speakers to speak for 45 minutes each, including their responses to questions. Dr. Victoria Sougthgate (University of London) presented how we predict actions, and in particular the development of action prediction during infancy. Dr. Mortiz Daum (Max Plank Institute, Germany) spoke about the neural mechanism of action understanding focusing on the early stage of it. His talk provided an introduction of brain mechanism of the action understanding. Finally, Dr. Elizabeth Hill (University of London) presented a series of studies investigating the role of motor abilities for children having a neurodevelopmental disorder and for healthy children. She demonstrated that there was structural and functional difference in motor functions in a typical brain from an atypical brain as it grows.

After a nice coffee break, Dr. Maddie Groom (University of Nottingham) started the second session with her talk titled as electrophysiological correlates of response control in children with ADHD. She demonstrated that ERP components were highly correlated to the performance of children with ADHD compared to the age-matched controls. Dr. Sarah Durston (University of Utrecht) provided evidences that children who were diagnosed as ADHD were not homogeneous by showing their

neurobiological individual difference.

Dr. Andrea Berger (Ben-Gurion University of the Negev) continued her talk in ADHD session after a lunch. She showed behavioural and electrophysiological evidences that preschooler at familial risk for ADHD presented lower score in the inhibitory control when they performed stop-signal experiments. These results suggest that the cause of ADHD is genetic and the family history can be a predictive factor for ADHD. Philip Shaw (NIMH, USA) presented huge longitudinal data over 800 magnetic resonance scans demonstrating that there is a delay in regional cortical maturation in ADHD. He demonstrated that the most prominent in regions showing the delay is the frontal cortex however, people with and without ADHD showed similar back-to-front wave of brain maturation.

After the tea break, there was a keynote lecture by Professor Annette Karmiloff-Smith (University of London) as the last talk for the first day of the workshop. She gave an excellent talk overviewing the atypical developmental brain. She also provided advantages and disadvantage of many methods to investigate the typical and atypical brain development suggesting multiple converging methods.

The last session was for poster presentations. We had 24 posters covering full range of topics in typical and atypical brain development.

The second day started with two introductory talks about the normal development of executive function. Dr. Lucy Cragg (University of Nottingham) overviewed the typical development of interference control. The second presentation of Charo Rueda (Universidad de Granada) showed that the role of genes and experience in the development of executive attention. Both of them gave a great introduction for following talks related Tourette's syndrome.

After the coffee break, Dr. Jeremy Stern (St George's Hospital) opened the Tourette's syndrome session with his talk titled as clinical perspectives on Tourette's syndrome. He provided an excellent overview about Tourette's syndrome for the audience. Following his talk, Professor Stephen Jackson (University of Nottingham) presented meta-analysis data demonstrating the brain regions related to the urge-for-action. He conducted three different meta-analysis related to the urge such as swallowing, yawning, and micturition and compared the activated area in children with Tourette's syndrome. These results suggest that the common network related to motivation for action may be responsible for the intention during the execution of goal-directed actions. Professor Georgina Jackson (University of Nottingham) spoke about adaptive functional and neural reorganization in Tourette's syndrome. A series of well-controlled experiments were described, testing the hypothesis that children with Tourette's syndrome develop their brain differently to overcome their deficits resulting in structural and functional brain changes.

Dr. Tara Murphy (Great Ormond Street Hospital) continued the Tourette's session with the perspective of psychological therapy after the lunch. She described the past, present, and future direction of clinical therapy for Tourette's syndrome.

The tea break was followed by her outstanding talk, and Professor Bradley Peterson (Columbia University) offered keynote lecture. He presented many neuroimaging studies of serious childhood neuropsychiatric disorders, including Tourette's syndrome, ADHD, OCD, and Autism to integrate measures of brain structure and function.

Dr. Sarah White (University College London) started the third day of the workshop with her talk titled as heterogeneity in autism: dose intact task

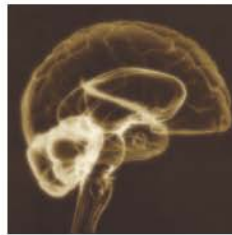
performance equate to intact cognition and vice versa? She pointed out the limit of previous autism studies and re-assessed the Embedded Figures Test testing weak central coherence and individuals with autism with relatively large autism groups. The second speaker, Professor Edward de Haan (Amsterdam University) presented selective developmental deficits in terms of visual recognition. He gave an excellent overview of the impairment of visual recognition in various developmental disorders.

After the coffee break, Professor Vicki Anderson (University of Melbourne) presented that early brain injury influences and predicts preinjury adaptive abilities, and whose families are coping poorly. Dr. Duncan Astle (University of London) introduced how children can interact with attention and memory. He presented the relationship between development, training, and the neural mechanisms of attentional control during childhood.

The last keynote lecture was presented by Professor Mark Johnson (University of London). His talk was about the typical and atypical development of the social brain he gave an excellent overview of how specialize cognitive functions emerge within particular brain regions during development. Using ERP, NIRS, and behavioural methods, he showed brain network changed according to the development.

Overall, the meeting succeeded in bringing together eminent scientists in this field and attracting junior scientists. It provided a state-of-the-art overview of the wide range of brain development. The meeting offered a place to discuss the issues during oral as well as poster sessions.

**The developing brain:
Perspectives from typical and atypical
development**



14th - 17th September 2011
Carmen de la Victoria, Granada - Spain



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Organization

This conference is funded by a European Science Foundation grant for the European Research Network for Investigating Human Sensorimotor Function in Health and Disease.

Organising Committee:

Vicki Anderson, University of Melbourne

Georgina Jackson, University of Nottingham

Gaia Sceriff, University of Oxford

Jeremy Stern, St. Georges Hospital, London

Charo Rueda, Universidad de Granada

Programme

14th September 2011

19.00 – 21.00: Welcome Reception, Carmen de la Victoria

15th September 2011

**9.00-9.15: *Introduction To ERNI-HSF Programme*
Stephen Jackson, School of Psychology, University of Nottingham, UK**

**9.15-10.00: *Action Prediction In Infancy*
Victoria Southgate, Birkbeck College, University of London, UK**

**10.00-10.45: *Mechanisms Of Early Action Understanding*
Moritz Daum, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany**

**10.45-11.30: *The Role Of Motor Abilities In Typical And Atypical Development*
Elizabeth Hill, Department of Psychology, Goldsmiths University of London, UK**

11.30-12.00 COFFEE BREAK

**12.00-12.45: *Electrophysiological Correlates Of Response Control In Children With ADHD*
Maddie Groom, School of Community Health Sciences, Division of Psychiatry, University of Nottingham, UK**

**12.45-13.30: *Neurobiological Heterogeneity In ADHD*
Sarah Durston, Department of Child and Adolescent Psychiatry, University of Utrecht, The Netherlands**

13.30-15.00 LUNCH

**15.00-15.45: *Response Inhibition In Preschoolers At Familial Risk For ADHD: A Behavioural And Electrophysiological Stop-Signal Study*
Andrea Berger, Department of Psychology, Ben-Gurion University of the Negev, Israel**

**15.45-16.30: *In For The Long Haul: Using Longitudinal Neuroimaging To Understand ADHD*
Philip Shaw, Child Psychiatry Branch, NIMH, USA**

16.30-17.00: TEA BREAK

17.00-18.00: **Keynote Lecture 1: *The Importance Of Developmental Clues To The Atypically Developing Brain***
Annette Karmiloff-Smith, Developmental Neurocognition Lab,
Department of Psychological Sciences, Birkbeck College, University of
London, UK

18.00-20.30: **POSTER SESSION - Carmen de la Victoria**

18:00 - 19:15 Posters 1 to 12

19:15 - 20:30 Posters 13 to 24

16th September

- 9.15-10.00: ***The Typical Development Of Interference Control***
Lucy Cragg, School of Psychology, University of Nottingham, UK
- 10.00-10.45: ***The Development Of Executive Attention: Role Of Genes And Experience***
Charo Rueda, Department Psicología Experimental, Universidad de Granada, Spain

10.45-11.15 COFFEE BREAK

- 11.15-12.00: ***Clinical Perspectives On Tourette Syndrome***
Jeremy Stern, Research Director Tourettes Action and Consultant Neurologist, St George's Hospital, London, UK
- 12.00-12.45: ***Functional Anatomy Of The Urge-For-Action***
Stephen Jackson, School of Psychology, University of Nottingham, Nottingham, UK
- 12.45-13.30: ***Adaptive Functional And Neural Reorganisation In Tourette Syndrome***
Georgina Jackson, Division of Psychiatry, University of Nottingham, Nottingham, UK

13.30-15.00 LUNCH

- 15.00-15.45: ***Psychological Therapies For Tic Disorders: Past, Present And Future***
Tara Murphy, Tourette Syndrome Clinic, Great Ormond Street Hospital, London, UK

15.45-16.30: TEA BREAK

- 16.30-17.30 ***Keynote Lecture 2: The Developing Sensorimotor System In Health And Disease***
Bradley Peterson, Child Psychiatry, Columbia University, USA

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- 20.30 **FLAMENCO SHOW & CONFERENCE DINNER, Gardens of the Carmen de la Victoria**

17th September

9.30-10.15: *Heterogeneity In Autism: Does Intact Task Performance Equate To Intact Cognition And Vice Versa?*
Sarah White, Institute of Cognitive Neuroscience, University College London, UK

10.15-11.00: *Selective developmental deficits; the case of visual recognition*
Edward de Haan, Department of Neurology, Amsterdam University, The Netherlands

11.00 - 11.30 COFFEE BREAK

11.30-12.15: *The Developing Brain's Capacity For Plasticity: Lessons From Early Brain Insult*
Vicki Anderson, Critical Care & Neurosciences Research, MCRI, University of Melbourne, Australia

12.15-13.00: *Interactions Between Attention And Memory In Children*
Duncan Astle, Department of Psychology, Royal Holloway College, University of London, UK

13.30-15.00 LUNCH

15.15-16:15: **Keynote Lecture 3: *The Typical And Atypical Development Of The Social Brain***
Mark Johnson, Centre for Brain & Cognitive Development, Birkbeck, University of London, UK

16.15-16.45 TEA